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Lonicera henryi Hemsl. – a potential exotic forest weed in Switzerland

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Abstract

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Lonicera henryi is an introduced climbing woody perennial that has become naturalized in scattered localities in Switzerland. Growth-related traits of this vine were measured at one forest site near Zurich to assess its invasion potential. Current-year shoots were 47–150 cm long, indicating fast growth. There were 128–366 shoots or stems and 0–96 rooted nodes per m^{-2} of forest floor, indicating considerable competition for other species. Species richness was significantly lower in plots covered by *L. henryi* mats compared to adjacent control plots. The results suggest that *L. henryi* has a considerable ability to cover forest floors with a carpet of intertwining stems, and to climb rapidly on shrubs and trees. Further spread of this vine may impede forest tree establishment and crowd out native species.

Key words: Exotic species, plant invasions, invasive species.

Introduction

A major issue in the conservation of natural ecosystems and biodiversity are biological invasions by alien species (Kowarik 2003). The impacts of invasive plant species include outcompeting of native animal and plant species and changes in ecosystem functions (Luken and Thieret 1997). In Switzerland, invasive plants are most abundant at ruderal sites (Tinner and Schumacher 2004), but several species can also colonise more natural vegetation, such as deciduous forests (Walther 2003; Keller 2004), and some of them conflict with the conservation of natural habitats (Weber 2000). These species are listed by the Swiss Commission for the Conservation of Wild Plants (SKEW; www.cps-skew.ch). Invasive plants which are already established and widespread are often difficult to control, and attempts for removal are time consuming and cost expensive. Preventing the entry of invasive plants into a region by means of legislation, and prevention of the spread of plants that have already become established but are not yet widespread, would be the easiest and cheapest method to control plant invasions (Zamora et al. 1989).

Worldwide, several species of *Lonicera* are considered as serious environmental weeds with far reaching ecological consequences (Weber 2003). They may affect ecosystems by forming large and dense stands, thereby reducing biodiversity and changing the light conditions. The most widespread of them is *L. japonica*, a trailing and climbing woody vine that is also invasive in southern Switzerland, e.g. in the cantone Tessin where it smothers trees and shrubs with a dense curtain of stems, especially in riparian forests (www.cps-skew.ch).

One species of that genus that might increasingly spread in the future is *Lonicera henryi* Hemsl. (*L. acuminata* Wall.), native to eastern India, Nepal, western China and Taiwan, growing in forests and shrublands of the high mountains from 2000–3600 m a.s.l. (Chiu 1998; Huang 1998). It is introduced in Europe and commonly used as an ornamental plant in landscaping and in gardens. In Switzerland, the species is reported as occasionally escaping (Landolt 2001; Lauber and Wagner 1998) but is not fully naturalized. So far, locations with *L. henryi* are confined to the area of Zurich (Bäumler, pers. comm.). There are no records of spontaneous populations of *L. henryi* and naturalizations in other European countries.

The plant is a strong evergreen climber reaching 10 m height, with characteristic oblong-lanceolate leaves of 4–12 cm length and hairy young shoots. It produces both trailing and climbing stems (Fig. 1), and stems easily root at nodes if they get in contact with soil. This growth habit is similar to that of *L. japonica* and makes the species a potentially serious forest weed with the capability to cover the forest floor and to climb over shrubs and on trees. Therefore, SKEW has put the species on the watch-list of potentially invasive plant species (www.cps-skew.ch).

Here, data are provided that demonstrate the vine's growth potential, and the necessity of monitoring this species is discussed.

Methods

End of May 2004, growth related traits were studied in one population of *Lonicera henryi* in a forest at the Äntlisberg near Zurich (47°19' N, 8°22' E). The forest was dominated by *Picea abies*, with *Fraxinus excelsior* and *Cornus sanguinea* frequent in the shrub layer, and *Oxalis acetosella*, *Galium odoratum*, *Lamium galeobdolon*, *Acer pseudoplatanus* and *Rubus* sp. being the most frequent species in the herb layer. The size of the patch of *Lonicera henryi* was *c*. 50 m^2. The population consisted of numerous and intermingled trailing and climbing stems (Fig. 1). The following traits were measured: The length of 40 randomly sampled trailing and climbing shoots, respectively, corresponding to this year's new growth; the heights of plants climbing on trees; the thickness of ground covering mats of *L. henryi* stems at ten randomly selected points; the diameter of 40 randomly sampled woody stems; the number of young shoots, woody stems and rooted nodes within each of eight 50×50 cm plots placed within mats of *L. henryi*. In addition, the number of native species in eight 0.25-m^2 plots covered by *L. henryi* and in eight control plots adjacent to the *L. henryi* patch was counted.

Results and Discussion

The shoot length and shoot density of *Lonicera henryi* were considerable. Climbing new shoots were significantly longer than shoots trailing on the floor (*t*-test; $P < 0.001$)

Fig. 1. *Lonicera henryi* invading a forest site near Zurich.

Tab. 1. Growth characteristics of *Lonicera henryi* at the Äntlisberg near Zurich. Plot size was 50 × 50 cm (n = 8).

Characteristic	Mean ± *SE*	Range
No. of young shoots per plot	19.5 ± 1.8	12–28
No. of woody stems per plot	33.8 ± 5.0	20–62
No. of rooted nodes per plot	14.1 ± 3.0	0–24
Thickness of mat of trailing shoots on forest floor	29 ± 1.6 cm	20–39 cm
Maximum heights of climbing plants	165 ± 41 cm	100–450 cm
Diameter of woody stems	2.8 ± 0.12 mm	1.4–5.0 mm
Length of trailing shoots	75.9 ± 2.4 cm	47–104 cm
Length of climbing shoots	95.3 ± 3.7 cm	51–150 cm

and reached 1.5 m length (Table 1). Since the length of shoots corresponds to this year's growth, the values indicate growth rates up to the date of measurement. Whether the differences in length between trailing and climbing stems is due to age differences of the older stems or due to increased growth rate in climbing shoots needs further investigations.

The mats of *L. henryi* on the forest floor contain numerous shoots and stems, suggesting a strong crowding out effect. On average, 53 stems (young shoots and woody stems) per plot have been found, and there are numerous rooted nodes (Table 1). Native species richness in plots covered by *L. henryi* was significantly lower than in control plots immediately adjacent to the *L. henryi* patch (1.1 vs. 4.1, $P < 0.001$). Within stands of *L. henryi*, the most frequent species was *Rubus* sp., and the number of species per 0.25-m^2 plot ranged from 0-3 whereas it ranged from 3–7 in the control plots. Whether these results demonstrate a crowding out effect caused by the alien vine or whether *L. henryi* colonized a disturbed and species poor site is unknown and requires further investigations. Nevertheless, the large number of stems and shoots within *L. henryi* mats indicates that the establishment of native herbs and trees is hindered.

The high number of horizontal stems and rooted nodes in the soil imply that any attempts to remove the liana at this state is difficult to achieve. However, it would be wise to remove such stands as complete as possible in order to prevent further spread. Numerous young shoots outside the stand have been observed, indicating the species potential to spread. If the plants set fruits, spread is enhanced as the berries are likely be eaten by birds. The impact of *L. henryi* may therefore be similar to that of *L. japonica* in southern Switzerland.

Zusammenfassung

Lonicera henryi ist eine immergrüne Kletterpflanze asiatischen Ursprungs, die in Europa als Gartenpflanze häufig anzutreffen ist. Spontane Vorkommen sind bisher nur aus der Schweiz bekannt, namentlich aus dem Mittelland. Da es sich um eine rasch wachsende Liane handelt, liegt die Vermutung nahe, dass *L. henryi* eine potentiell invasive Art ist. Dafür spricht auch die Tatsache, dass die nahe verwandte und ebenfalls kletterende *L. japonica* bereits Probleme für den Naturschutz verursacht. Auf dem

Äntlisberg nahe Zürich wurde ein Bestand von *L. henryi* näher untersucht. Dieser zeichnete sich durch eine Vielzahl ineinander verschlungener diesjähriger Sprosse und verholzter älterer Sprosse aus, die zumeist am Boden krochen jedoch auch an Bäumen und Sträuchern emporkletterten. Die Länge der diesjährigen Sprosse reichte von 47–150 cm und veranschaulicht das rasche Wachstum der Art. Die Anzahl horizontaler Sprosse in *L. henryi* Matten betrug 128–336 m^{-2}, die Anzahl bewurzelter Knoten 0–96 m^{-2}. Die Ergebnisse machen deutlich, dass *L. henryi* rasch wächst und hoch produktiv ist, und dadurch ein hohes Invasionspotential besitzt. Vermutlich können etablierte Bestände wegen der Vielzahl bewurzelter Knoten und der hohen Sprossdichte nur sehr schwer kontrolliert werden.

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